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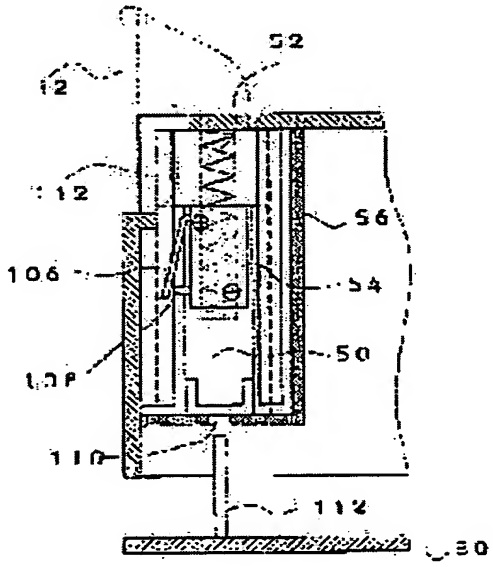
## (54) SAFETY DEVICE FOR ELECTRONIC EQUIPMENT APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To realize a safety device for rendering an electronic equipment apparatus, having a plurality of doors in a non-conductive state by opening/closing the respective doors in space-saving at a low cost, without restricting operability in the apparatus.

SOLUTION: One switch 54, connected to a circuit of the electronic equipment apparatus, is provided by engaging one end of a lever 106 which acts at an on/off sensing piece in a circuit with a switching body. The switch 54 is mounted at a slidably moving base 50, and a protrusion piece 112 provided at one door is contacted with the base 50, interlocking with the opening/closing of the door to make the switch 54 move to a position of action for a separate protrusion piece 114 of the door.




LEGAL STATUS

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[Date of extinction of right]

* NOTICES *



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CLAIMS

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[Claim(s)]
[Claim 1] In the electronic equipment equipment which has the 1st and 2nd doors which can be opened and closed outside Said 1st and 2nd doors of each other can be opened and closed with regards to the switching condition of the door of another side that there is nothing. When at least one side of said 1st and 2nd doors is opened, the energization to an internal electronic member is turned off. The safety device with which the energization to an internal electronic member is turned on only when said both 1st and 2nd doors are closed is formed. Said safety device is a safety device of the electronic equipment equipment which consists of one switch formed in said body of electronic equipment equipment movable, and is characterized by said switch being formed by closing motion of one door free [ migration ].
[Claim 2] Said switch formed in said safety device is the safety device of claim 1 whose free one end of said lever member is the switch energized in the direction which separates from a switch as switched off while having the lever member which is stopped by the switch body rockable and extended and turning a switch on and off by motion of said lever member.
[Claim 3] Said switch is fixed to the movable carriage attached in the one direction free [ a slide ] to said body of electronic equipment equipment. According to closing motion, disjunction is carried out to said movable carriage, and the part which carries out slide migration is prepared in it at said 1st door. Said a part of 2nd door The safety device of the electronic equipment equipment of claim 1 characterized by being located so that disjunction may be carried out to said some of switches which carry out slide migration by closing motion of said 1st door and it may be made turned on and off in the condition of having been closed.
[Claim 4] For the installation direction, said switch is [ the field where it has the lever member of said switch ] the safety device of the electronic equipment equipment of claim 1 with which it is located in said 1st door and the opposite side of the direction where it counters, and is characterized by being the direction in which the stop section of said lever member becomes close to the 2nd door to said movable carriage.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the safety device of the electronic equipment equipment which has two or more closing motion doors including image formation equipments, such as a copying machine, and a printer, facsimile.
[0002]
[Description of the Prior Art] When a door is able to open the safety device formed in the closing motion door of electronic equipment equipment, it is for protecting an operator from accident, such as electrification, by the actuation being interlocked with and turning OFF energization to internal electronic equipment. With image formation equipment, in order to remove the form which is in the middle of supply of a toner or conveyance, and carried out the paper jam, it has two or more doors in many cases. Since energization must be turned off if any one of the doors which have more than one with these equipments can open, it is common that the safety device is formed in each door.
[0003] Moreover, as an option, the safety device of closing motion detection is formed in one door, and the method which establishes the device mutually restricted about closing motion of the door and closing motion of other doors is also carried out. With the equipment using the method, the interference member which is interlocked with the switching action of a door, moves and interferes in closing motion of other doors is prepared so that other doors cannot open unless it opens the door in which the safety device was formed, and the door in which the safety device was formed when other doors were not closed cannot close.
[0004]
[Problem(s) to be Solved by the Invention] Although a general approach forms a safety device in each door, there is a demerit which cost raises. Moreover, the tooth space in which the safety device which includes a switch etc. to each door in small electronic equipment equipment is formed is secured, or it is generated also when it is difficult to carry out wiring to a safety device. On the other hand, since another door cannot open the approach which forms the safety device which detects closing motion only at one door, and the switching condition of the door regulates in relation to closing motion and the device target of other doors unless it opens the door in which the safety device was surely formed, its actuation is troublesome. Moreover, a user unfamiliar to actuation performs impossible actuation, without knowing the closing motion approach of a door, or is mistaken in the sequence opened and closed carelessly, and has the danger of damaging a door. This invention solves these troubles and it aims at offering the safety device corresponding to the closing motion of two or more doors with sufficient operability by low cost.
[0005]
[Means for Solving the Problem] The safety device already kicked by electronic equipment equipment according to claim 1 corresponds to the 1st and 2nd 2 doors which can be opened and closed independently, and when one of doors opens, the energization to internal electronic equipment is turned off. One switch is formed in the body of electronic equipment equipment movable, and it is characterized by the location of the switch being changed by closing motion of the 1st door. It becomes possible to turn on and off the energization to internal electronic equipment only by using one switch by adopting such a configuration corresponding to two doors, the 1st and the 2nd, opening and closing independently, and a cheap space-saving safety device is realized.

[0006] While the switch used for a safety device according to claim 2 has the lever member to which an end is stopped by the switch body rockable and extended and a switch is turned on and off by motion of said lever member, the other end side of said lever member is characterized by being the switch energized in the direction which separates from a switch so that it may always switch off. Since a part of one door can act on the lever of a switch physically and it can make it turned on and off by this, the safety device which operates certainly to closing motion of a door that it is hard to be influenced of external is realized.
[0007] A safety device according to claim 3 is held on the movable carriage in which one switch is attached after having been energized by the one direction with the elastic means movable to the body of electronic equipment equipment, and with closed actuation, the 1st door contacts said movable carriage, and the part resists said energization force and carries out slide migration of it. Furthermore, in the condition of having closed, the 2nd door is located so that disjunction may be carried out to some switches in which the part carries out slide migration by the movable carriage and one by closing motion of said 1st door and it may be made turned on and off. Since a movable carriage can be fabricated in the optimal configuration using a resin member etc., the body configuration of electronic equipment equipment and the design according to the configuration of a door can be performed, and it also becomes easy to use the switch of the configuration of an existing product. Therefore, it is cheap and the large safety device of an application is realized.
[0008] The safety device according to claim 4 is characterized by being attached in said migration frame as the stop section of said lever member is in the downstream of the slide direction. Thereby, disjunction of the switch which carries out slide migration by closing motion of the 1st door is smoothly carried out to the 2nd door in the condition of having closed, and the good safety device of operability is realized.
[0009]
[Embodiment of the Invention] Hereafter, the gestalt of the operation in a reproducing unit is explained with reference to a drawing about this invention. In addition, the gestalt and example of the following operations are an example which materialized this invention, and are not the thing of the character which limits the technical range of this invention.
[0010] Drawing 1 and 2 are the external views which looked at the reproducing unit equipped with the safety device concerning 1 operation gestalt of this invention from the front and the method of left-hand side. A reproducing unit 1 is equipment formed into small lightweight for general users with comparatively little amount of the copy used. Drawing 3 is the mimetic diagram showing drawing 1 and the main configuration members of a reproducing unit shown in 2. In drawing 3 , on the base frame 24 fabricated with the resin ingredient, the imaging frame 26 similarly generated with the resin ingredient is fixed, and the case of a reproducing unit 1 is constituted. Furthermore the image reader 4 is attached in the upper part of the imaging frame 26, and the right end side is connected with the base frame 24 by the back up plate 28, and is supported. On the contact glass of the image reader 4, the manuscript transport device 2 which serves as covering of the manuscript installed on contact glass with the function to carry out automatic conveyance of the manuscript is installed. The form receipt tray 6 which carries out the laminating receipt of the transfer paper by which image formation is carried out is inserted in the base frame 24. Moreover, the imaging frame 26 is equipped with the image formation unit 8 containing the photo conductor drum 20, cleaning equipment 23, or developer 22 grade, the write-in optical unit 16, and the anchorage device 10 grade. Moreover, the perpendicular conveyance unit 42 in which the conveyance means and guide side for conveying a transfer paper towards the imprint roller 18 by which opposite arrangement is carried out, or its opposite section to the photo conductor drum 20, and guiding an anchorage device 10 were established is attached in the left part of the imaging frame 26 rotatable by the downward supporting point 100. The drive motor, the electric base, etc. are contained by the posterior part of plot frame 26 grade. Moreover, the anterior part of the imaging frame 26 is equipped with a toner cartridge 34 or the toner recovery tank 36 as shown in drawing 1 .
[0011] Furthermore, basic actuation of a reproducing unit 1 is explained using drawing 3 . the image information which scanned the manuscript and was read in the image read station 4 -- a signal -- are-izing, and it writes in and is sent to the optical unit 16, and on the photoconductor drum 20 charged with the electrification means 21, the image based on the signal is exposed and an electrostatic latent

image is formed. Toner imaging of the electrostatic latent image is carried out with a developer 22. On the other hand, according to it, one sheet is sent out at a time from the imprint tray 6, and a transfer paper turns the method of left-hand side of a reproducing unit 1 up by the perpendicular conveyance unit 42, and is conveyed in it. The here aforementioned toner image is imprinted on a transfer paper in the part (imprint field) which the imprint roller 24 and the photo conductor drum 20 contact. A transfer paper is conveyed further, passes a heat roller pair in the fixing section 10, and melting fixing of the toner image on a transfer paper is carried out at a transfer paper, and it is discharged by discharge tray top 14.

[0012] The toner supply drive 38 which shows the toner consumed by carrying out toner imaging of the latent-image image with a developer 22 to drawing 1 according to toner concentration detection operates at any time, and the toner in a toner cartridge 34 is supplied to a developer 22. Moreover, the toner which remained on the front face of the photo conductor drum 20, without a transfer paper imprinting is recovered by cleaning equipment 23, and is discharged by the toner recovery tank 36. It is equipped with this toner cartridge 34 and the toner recovery tank 36 removable to the reproducing unit 1, and they are exchanged for a new thing by at any time according to use.

[0013] As shown in drawing 1 and 2, the front door 30 ( drawing 1 ) and the conveyance door 32 ( drawing 2 ) are formed in the sheathing side of a reproducing unit 1 independently possible [ closing motion ], respectively. A front door 30 is formed over full in the front pars intermedia of a reproducing unit 1 for exchange of the image formation unit 8, a toner cartridge 34, and the toner recovery tank 36 etc., and the supporting point opens and closes near a lower limit. If a toner cartridge 34 is inserted in the direction of an arrow head X according to the rib 126 of a body from the front and reaches a hit of an existing orientation, it will be made to slide in the direction of an arrow head Y for a while, and will be set to it. At this time, the projection 122 projected on the side face of a toner cartridge 34 engages with the toner supply drive 38 prepared in the body of a reproducing unit 1. Moreover, the lid of the opening 118 of a toner cartridge 34 engages and opens to the projection 124 of the image formation section 8, and is located above the opening 116 of a developer 22 at coincidence. The toner recovery tank 36 is set to the bottom of the toner recovery way 120 which engaged the low section with the locating lug 128 of a reproducing unit 1, and was projected from the cleaning equipment 23 of the image formation section 8 from the front after equipping with a toner cartridge 34. In addition, if the clearance in the condition of the toner recovery tank 36 and a toner cartridge 34 of having been set is very small and the toner recovery tank 36 is not removed, it has the structure where a toner cartridge 34 cannot be removed.

[0014] As shown in drawing 2 , a reproducing unit 1 is seen from a front face, and the conveyance door 32 is formed in the left lateral. The conveyance door 32 is formed over most left laterals of a reproducing unit 1, and as shown in drawing 3 , it is the perpendicular conveyance unit 40 which forms one side of the form conveyance way over the image formation section and the fixing section from the feed section, and the guide member, the conveyance roller, the imprint roller, etc. are attached by the inside side. When a transfer paper carries out the jam of the conveyance door 32 on a conveyance way, the supporting point opens and closes near a lower limit for form removal.

[0015] Here, since it is assumed also when a part of rotation driving members and electronic equipment inside equipment will be exposed and a hand will touch, if a front door 30 and the conveyance door 32 will be in an open condition, an insurance means to turn on and off the energization circuit which is interlocked with closing motion of each door and supplies power to a drive motor, electronic parts, etc. is established. The insurance means is the safety device 42 formed in the space of the corner section of the side attachment wall at the left end of the inside which opened the front door 30 as shown in drawing 1 , and the field in which toner recovery tank 36 grade is installed.

[0016] The external surface of a safety device 42 is covered with the safety device covering 56 with the 3rd page which intersects perpendicularly as shown in drawing 1 . The slot 110 is formed in the front face of the safety device covering 56, and the protruding piece 112 is formed in the location corresponding to a slot 110 at the front door 30. And if a front door 30 is closed, a protruding piece 112 is inserted in a slot 110, and has the structure of acting on the internal safety device 42 and turning on and off. Moreover, the safety device 42 is adjoined and formed in the left lateral side of a reproducing unit 1, gets down, and as shown in drawing 2 , opening 116 is formed and it is in the left

lateral of a reproducing unit 1. Moreover, the protruding piece 114 is formed in the location corresponding to the opening 116 at the conveyance door 32. And if the conveyance door 32 is closed, a protruding piece 114 is inserted in opening 114, and has the structure of acting on the internal safety device 42 and turning on and off. Only when opening either the front door 30 or the conveyance door 32, and the energization to electronic parts, such as a drive motor and a power-source base, is turned off and both doors are closed by this, it will be in the condition which can be energized.

[0017] The configuration of a safety device 42 is explained to a detail in drawing 4 . Drawing 4 (a) is drawing in which having seen from the top face of a reproducing unit 1, and having shown the configuration of a safety device 42. Similarly drawing 4 (b) is drawing seen from the left lateral of a reproducing unit 1. Moreover, drawing 4 (c) is drawing seen from the front of a reproducing unit 1. The movable carriage 50 is arranged at the safety device 42, and the switch 54 is attached in the top face with the screw etc. fitting insertion is carried out to the slot which the projection 104 by which installation shaping was carried out in the depth direction at the projection 102 by which installation shaping was carried out, and the bottom wall of the near forms in the depth direction at the left wall of the imaging frame 26, and the movement toward right and left, the upper part, and rotation regulates a movable carriage 50 -- having -- a slot -- meeting -- order -- a slide -- it is equipped movable. Moreover, a hole is formed in the posterior part side of the slide migration direction of a movable carriage 50, it has become a cavity, and the spring 52 is inserted in the cavity. A spring 52 energizes a movable carriage 50 ahead in contact with the front wall of the imaging frame 26.

[0018] An end engages with a body at a switch 54, it is rotatable and the piece 108 of detection which is being energized according to elastic force and is carrying out the constant-rate protrusion from the body near the free end of the lever 106 which maintains a fixed include angle, and a lever 106 is formed in the condition that free one end is energized in the direction which separates from a body according to elastic force, and there is no external force. The installation to the movable carriage 50 of a switch 54 has sense which the engagement section of a lever 106 pushes in, is in the direction opposite side, and is installed in the migration direction. Moreover, wiring of the circuit energized on the electronic equipment in a reproducing unit 1 is connected with a switch 54 by insertion of a connector, and if a circuit is turned on and it projects more than fixed where the piece 108 of detection is pushed in, it has structure which a circuit turns off.

[0019] The safety device covering 56 which consisted of the 3rd page which intersects perpendicularly mutually engages with a body, and the safety device 42 including a movable carriage 50 and a switch 54 is attached and covered. Then, a movable carriage 50 is ahead energized with a spring 52, and the migration location is regulated in contact with the inside of the safety device covering 56. Moreover, the slit-like slot 110 is formed in the part of the contacting field by the width of face which is extent into which people's finger does not enter. The tabular protruding piece 112 with thickness thinner than the width of face of a slot 110 is formed in the location which counters a front door 30 at the aforementioned slot 110. When closing a front door 32, invading into a slot 110 and contacting the front section of a movable carriage 50, a protruding piece 112 resists energization of a spring 52, and is moved back. In the location in the condition that the front door 30 was closed and the movable carriage 50 was pushed back, opening 116 is formed in the side-attachment-wall section of the imaging frame 26 by the width of face which is extent with which a finger does not go into the location which crosses and counters in the die-length direction of the lever 106 of a switch 54. Moreover, the protruding piece 114 with thickness thinner than aperture width is formed in the location corresponding to said opening 116 at the conveyance door 32. The ramp is formed in one side of the point of a protruding piece 114. When the conveyance door 32 is closed, a protruding piece 114 invades into the opening 116 of the imaging frame 26, pushes in the piece 108 of detection in contact with the lever 106 of a switch 34, and changes it into an energization condition.

[0020] Next, actuation of the safety device 42 concerning this invention is explained. When both the front door 30 and the conveyance door 32 are closed, a movable carriage 50 is stuffed into the protruding piece 112 of a front door 30, and is in the location of drawing 4 (a), the protruding piece 114 of the conveyance door 32 pushes in piece of detection 108 in contact with the lever 106 of a switch 54, and the reproducing unit 1 is in the energization condition. Here, if the conveyance door

32 is opened as shown in drawing 5 , a protruding piece 114 separates from the lever 106 of a switch 54, a switch 54 is turned off and a reproducing unit 1 will be in the condition of not energizing. Next, where the conveyance door 32 is closed, in opening a front door 30, in order that a protruding piece 112 may move according to rotation of a front door 30, a movable carriage 50 is pushed on a spring 52, and moves ahead with a switch 54. If it moves more than fixed, since the lever 106 of a switch 54 will separate from the opposite location of the protruding piece 114 of the conveyance door 32 and will return to a free condition, it will be in the condition of not energizing. If a front door 32 is closed further again, a movable carriage 50 and a switch move back with a protruding piece 112, and a lever 106 is smoothly pushed in contact with the ramp at the tip of conveyance door 32 protruding piece 114, and will be in an energization condition again. Thereby, a reproducing unit 1 is in the middle of actuation, and since it will be in the condition of not energizing, automatically when working opening a front door 30 or the conveyance door 32, the insurance of an activity is secured. Moreover, since the safety device is covered with covering so that a finger etc. cannot be touched with covering, there are also few dangers of incorrect-operating.

[0021] As mentioned above, although the example about the case of two doors prepared in the front face and the side face was explained, neither the location and number of doors, nor a breaker style is limited to an example. It is possible to deal with the equipment of various configurations by changing suitably the configuration of the protruding piece of a door which acts on the die length of the configuration of a movable carriage or the lever of a switch, a configuration and a movable carriage, or the lever of a switch according to each electronic equipment.

[0022]

[Effect of the Invention] As explained above, since it makes it face to turn energization on and off corresponding to the switching action of two or more doors prepared in the sheathing section, it is not necessary to form the safety device according to individual in each door and one safety device is shared, while the safety device of the electronic equipment of this invention can plan cost reduction, occupancy tooth spaces decrease in number and the miniaturization of equipment is possible for it.

[0023] Furthermore, each door is the outstanding configuration of reducing the danger of an operation mistake and preventing breakage of the machine by it etc. while the degree of freedom of handling does the activity of increase and an operator easy, since it can open and close independently.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] The external view of the reproducing unit equipped with the safety device concerning this invention.
[Drawing 2] The external view of the reproducing unit equipped with the safety device concerning this invention.
[Drawing 3] The sectional view showing the main configurations of the reproducing unit equipped with the safety device concerning this invention.
[Drawing 4] The drawing explaining the configuration and actuation of the safety device of this invention.
[Drawing 5] The drawing in which the condition of a safety device when a front door opens in the safety device of this invention is shown.
[Description of Notations]
30 Front Door
32 Conveyance Door
42 Safety Device
50 Movable Carriage
52 Spring
54 Switch
56 Safety Device Covering
106 Lever
108 Piece of Detection
112 Protruding Piece (Front Door)
114 Protruding Piece (Perpendicular Conveyance Door)

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DRAWINGS

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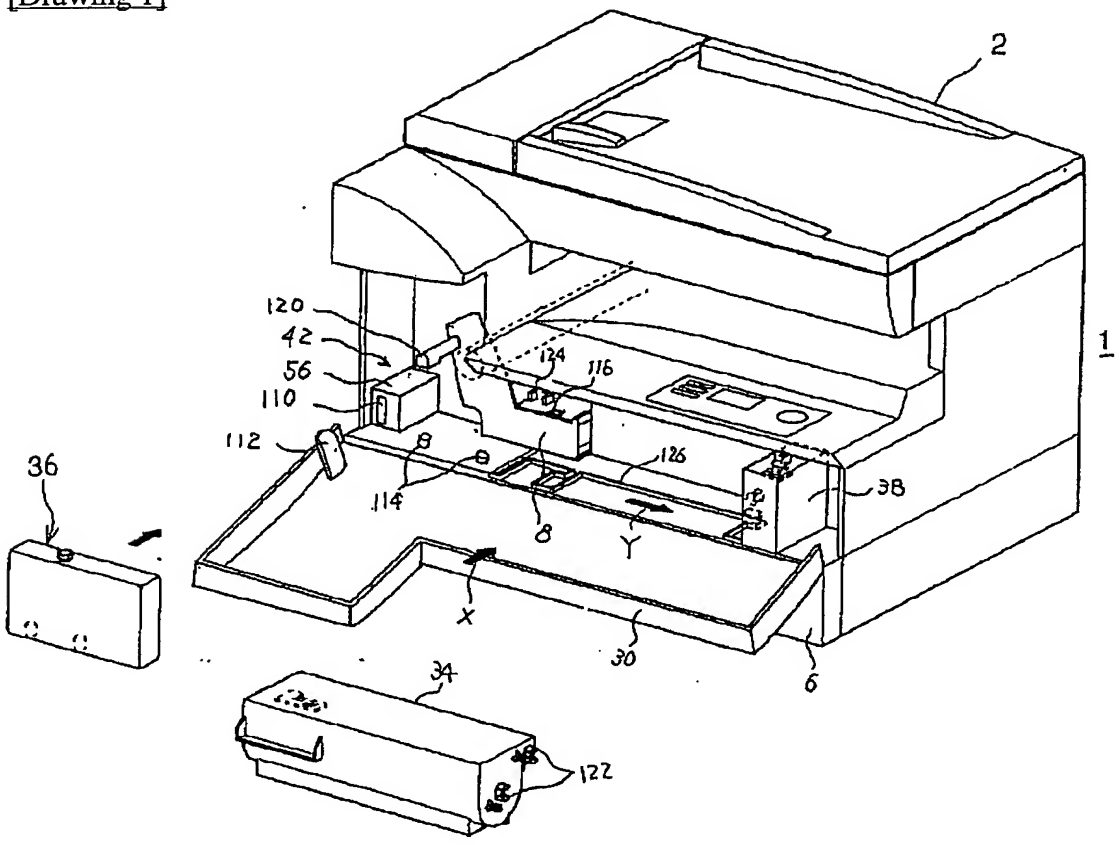
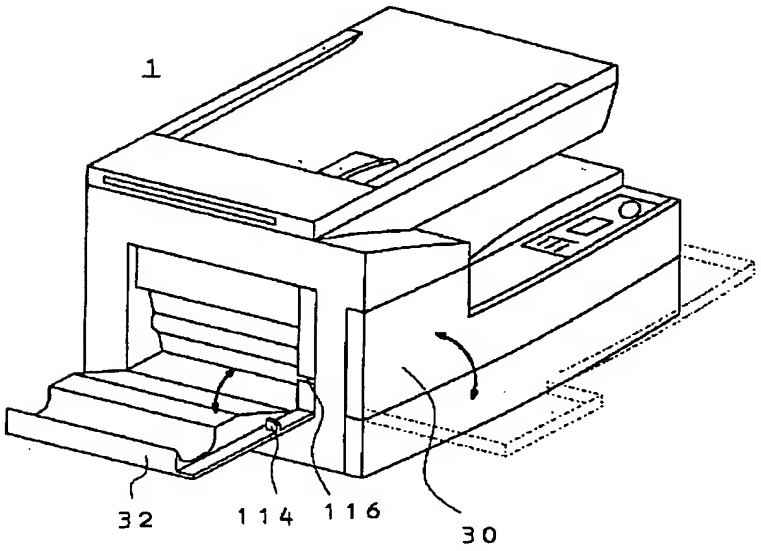
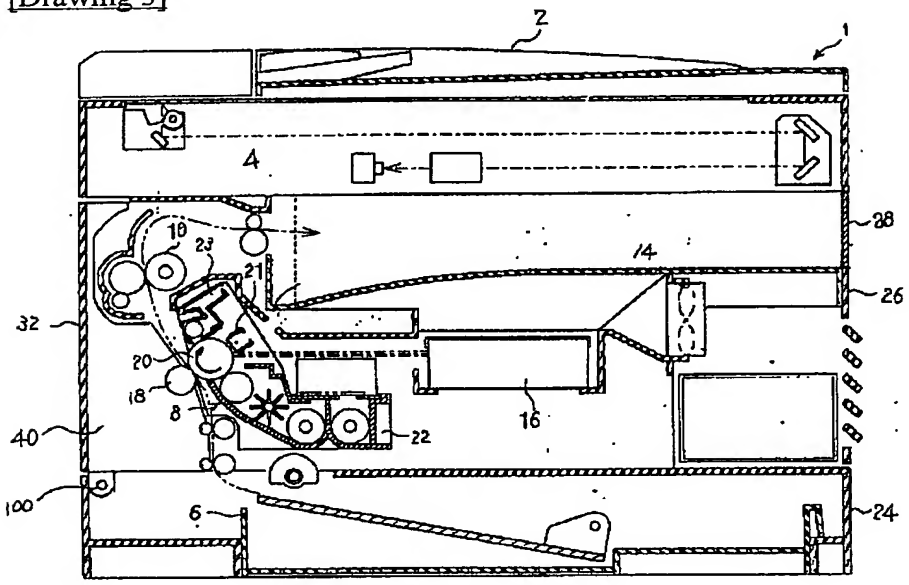
[Drawing 1]



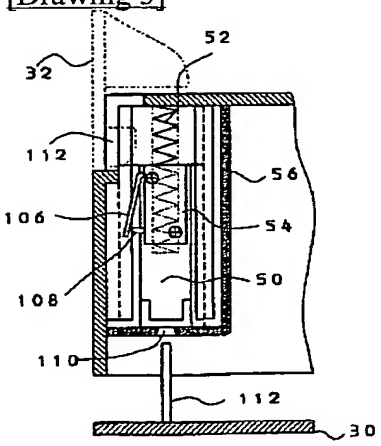

[Drawing 2]



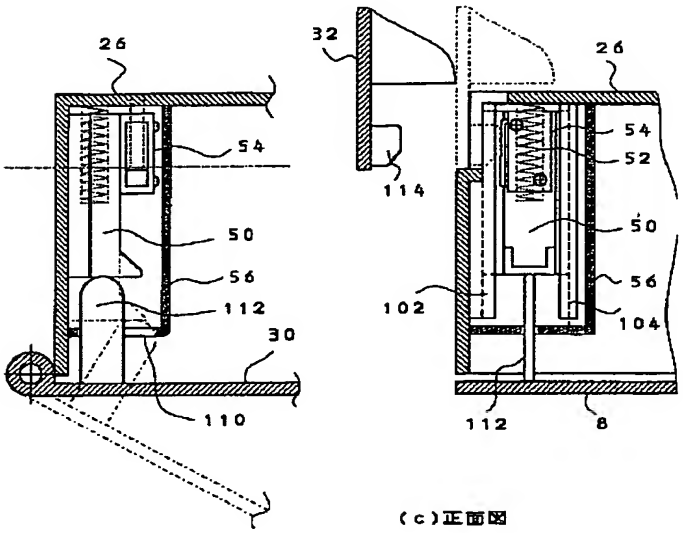

[Drawing 3]




[Drawing 5]




[Drawing 4]

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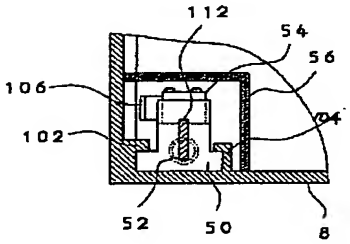


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# SAFETY DEVICE FOR ELECTRONIC EQUIPMENT APPARATUS

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**Publication date:** 2001-12-14
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**Applicant:** KYOCERA MITA CORP
**Classification:**
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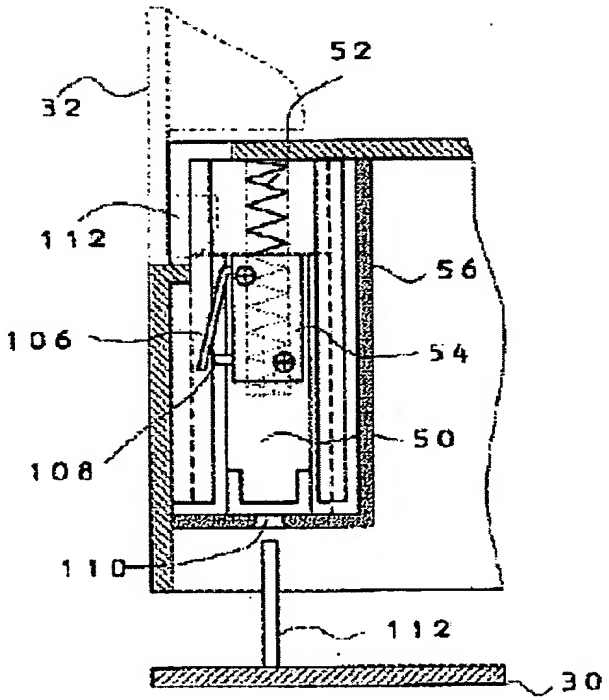
**Application number:** JP20000166512 20000531
**Priority number(s):** JP20000166512 20000531



Abstract of **JP2001345566**

PROBLEM TO BE SOLVED: To realize a safety device for rendering an electronic equipment apparatus, having a plurality of doors in a non-conductive state by opening/closing the respective doors in space-saving at a low cost, without restricting operability in the apparatus. SOLUTION: One switch 54, connected to a circuit of the electronic equipment apparatus, is provided by engaging one end of a lever 106 which acts at an on/off sensing piece in a circuit with a switching body. The switch 54 is mounted at a slidably moving base 50, and a protrusion piece 112 provided at one door is contacted with the base 50, interlocking with the opening/closing of the door to make the switch 54 move to a position of action for a separate protrusion piece 114 of the door.



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| | 21/00 | ５２０ | Ｈ０１Ｈ 21/28 | Ｅ | ４Ｅ３６０ |
| Ｈ０１Ｈ | 21/28 | | Ｈ０４Ｎ 1/00 | １０６Ｃ | ５Ｃ０６２ |

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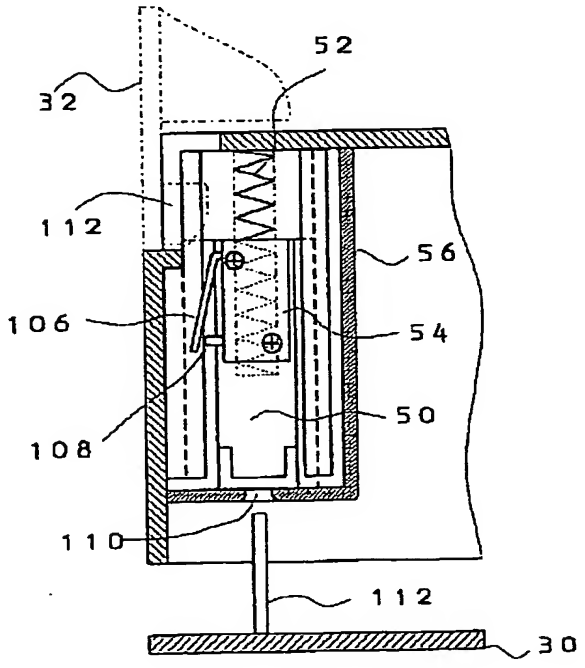
最終頁に続く

(54)【発明の名称】　電子機器装置の安全装置

(57)【要約】
【課題】複数の扉を持つ電子機器装置において、各扉の開閉により装置を非通電状態にする安全装置を安価で省スペースに作業性に制約を与えずに実現する。
【解決手段】電子機器装置の回路中に接続された一つのスイッチ５４は、回路をオンオフ検知片に作用するレバー１０６がスイッチ本体に一端を係合して設けられる。スイッチ５４はスライド自在の移動台５０に取り付けられ、一方の扉に設けられた突片１１２は扉の開閉に連動して移動台５０に当接して、スイッチ５４を別の扉の突片１１４を作用位置に移動させる。



【特許請求の範囲】

【請求項１】外面に開閉可能な第１及び第２の扉を有する電子機器装置において、

前記第１及び第２の扉は互いに他方の扉の開閉状態に関係無く開閉可能であり、前記第１及び第２の扉の少なくとも一方が開かれると内部の電子部材への通電がオフされ、前記第１及び第２の扉の両方が閉じられた場合にのみ内部の電子部材への通電がオンされる安全装置が設けられており、

前記安全装置は前記電子機器装置本体に移動可能に設けられた一つのスイッチから構成され、前記スイッチは一方の扉の開閉により移動自在に設けられていることを特徴とする電子機器装置の安全装置。

【請求項２】前記安全装置に設けられる前記スイッチは、スイッチ本体に揺動可能に係止されて伸びるレバー部材を持ち、前記レバー部材の動きでスイッチがオンオフされるとともに、スイッチをオフするように前記レバー部材の自由端側がスイッチから離れる方向に付勢されているスイッチである請求項１の安全装置。

【請求項３】前記スイッチは前記電子機器装置本体に対して一方向にスライド自在に取り付けられた移動台に固定され、前記第１の扉には開閉に応じて前記移動台に離接してスライド移動させる部分が設けられており、

前記第２の扉の一部は、閉じられた状態において、前記第１の扉の開閉によりスライド移動する前記スイッチの一部に離接してオンオフさせるように位置していることを特徴とする請求項１の電子機器装置の安全装置。

【請求項４】前記スイッチは前記移動台に対してその取り付け方向は、前記スイッチのレバー部材を有する面が、前記第１の扉と対向する方向の反対側に位置し、前記レバー部材の係止部が第２の扉に近くなる方向であることを特徴とする請求項１の電子機器装置の安全装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、複写機やプリンター、ファックス等の画像形成装置をはじめとして、複数の開閉扉を有する電子機器装置の安全装置に関するものである。

【０００２】

【従来の技術】電子機器装置の開閉扉に設けられる安全装置は、扉が開けられた際に、その動作に連動して内部の電子機器への通電をオフにすることにより、作業者を感電等の事故から保護するためのものである。画像形成装置等ではトナーの補給や搬送途中で紙詰まりした用紙を除去するために複数の扉を有する場合が多い。これらの装置では複数ある扉のどれか一つが開けられれば通電をオフしなければならないために、各扉に安全装置が設けられているのが一般的である。

【０００３】また別の方法としては、一つの扉に開閉検知の安全装置を設け、その扉の開閉と他の扉の開閉に関



して互いに制限する機構を設ける方式も実施されている。その方式を用いた装置では、安全装置が設けられた扉を開かないと他の扉が開くことができず、また他の扉が閉じられていないと安全装置が設けられた扉が閉じることができないように、扉の開閉動作と連動して移動し他の扉の開閉に干渉する干渉部材が設けられている。

【０００４】

【発明が解決しようとする課題】それぞれの扉に安全装置を設けるのは一般的な方法であるが、コストがアップするデメリットがある。また、小型の電子機器装置においては各扉に対してスイッチなどを含む安全装置を設けるスペースを確保したり、安全装置への配線をするのが困難な場合も生じる。他方、一つの扉にのみ開閉を検知する安全装置を設け、その扉の開閉状態が他の扉の開閉と機構的に関連して規制する方法は、必ず安全装置が設けられた扉を開かないと別の扉が開くことができないため操作が面倒である。また操作に不慣れな使用者は扉の開閉方法が分からずに無理な操作を行ったり、あるいはうっかり開閉する順番を間違えて、扉を破損させてしまう危険性もある。本発明はこれらの問題点を解決し、低コストで操作性の良い、複数の扉の開閉に対応する安全装置を提供することを目的とする。

【０００５】

【課題を解決するための手段】請求項１に記載の電子機器装置にもうけられる安全装置は、独立に開閉可能な第１及び第２の二つ扉に対応し、いずれか一方の扉が開くと内部の電子機器への通電がオフされるものである。一つのスイッチが電子機器装置の本体に移動可能に設けられており、第１の扉の開閉によりそのスイッチの位置が切り替えられることを特徴としている。このような構成を採用することで、一つのスイッチを用いるだけで第１、第２の二つの扉が独立に開閉するのに対応して内部の電子機器への通電をオンオフすることが可能になり、安価で省スペースの安全装置が実現される。

【０００６】請求項２に記載の安全装置に用いられるスイッチは、一端がスイッチ本体に揺動可能に係止されて伸びるレバー部材を持ち、前記レバー部材の動きでスイッチがオンオフされるとともに、常時スイッチをオフするように前記レバー部材の他端側がスイッチから離れる方向に付勢されているスイッチであることを特徴としている。これにより、一方の扉の一部がスイッチのレバーに物理的に作用してオンオフさせることができるため、外部の影響を受け難く扉の開閉に対して確実に作動する安全装置が実現される。

【０００７】請求項３に記載の安全装置は、一つのスイッチが電子機器装置本体に対して移動可能に弾性手段により一方向に付勢された状態で取り付けられている移動台上に保持されており、第１の扉は閉動作に伴いその一部が前記移動台に接触し前記付勢力に抗してスライド移動させる。さらに、第２の扉は閉じた状態においてその

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一部が、前記第１の扉の開閉により移動台と一体でスライド移動するスイッチの一部に離接してオンオフさせるように位置している。移動台は樹脂部材等を用いて最適な形状に成形することが可能であるため、電子機器装置の本体構成や扉の形状に応じた設計ができ、既成品の形状のスイッチを用いることも容易になる。よって、安価で用途の広い安全装置が実現される。

【０００８】請求項４に記載の安全装置は、スライド方向の下流側に前記レバー部材の係止部があるように前記移動枠に取り付けられていることを特徴としている。これにより、第１の扉の開閉によりスライド移動するスイッチは、閉じた状態の第２の扉に対して滑らかに離接し、操作性の良い安全装置が実現される。

【０００９】

【発明の実施の形態】以下、本発明に関して複写装置における実施の形態について図面を参照して説明する。尚、以下の実施の形態及び実施例は本発明を具体化した一例であって、本発明の技術的範囲を限定する性格のものではない。

【００１０】図１、２は本発明の一実施形態に係わる安全装置を備えた複写装置を前方及び左側方から見た外観図である。複写装置１は比較的コピー使用量の少ない一般ユーザー向けに小型軽量化された装置である。図３は図１，２に示した複写装置の主要な構成部材を示す模式図である。図３において複写装置１の筐体は、樹脂材料で成形されたベース枠体２４の上に、同様に樹脂材料で生成された作像フレーム２６が固定されて構成されている。さらに作像フレーム２６の上部に画像読取り装置４が取り付けられ、その右端側は補強板２８によりベース枠体２４と連結され支持されている。画像読取り装置４のコンタクトガラス上には、原稿を自動搬送させる機能を持ちコンタクトガラス上に設置される原稿のカバーを兼ねる原稿搬送装置２が設置される。ベース枠体２４には画像形成される転写紙を積層収納する用紙収納トレイ６が挿入されている。また、作像フレーム２６には感光体ドラム２０やクリーニング装置２３や現像装置２２等を含む画像形成ユニット８、書き込み光学ユニット１６、定着装置１０等が装着されている。また、作像フレーム２６の左部には、感光体ドラム２０に対向配置される転写ローラ１８やその対向部に向けて転写紙を搬送し定着装置１０に案内するための搬送手段やガイド面が設けられた垂直搬送ユニット４２が、下方の支点１００により回動可能に取り付けられている。作図フレーム２６等の後部には駆動モータや電気基盤等が収納されている。また、作像フレーム２６の前部には図１に示すようにトナーカートリッジ３４やトナー回収タンク３６が装着される。

【００１１】さらに、図３を用いて複写装置１の基本動作を説明する。画像読取り部４で原稿を走査して読み取られた画像情報が信号化されて書き込み光学ユニット１

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６に送られ、帯電手段２１により帯電された感光ドラム２０上に、その信号に基づいた画像が露光されて静電潜像が形成される。その静電潜像を現像装置２２によりトナー画像化する。一方それに合わせて、転写紙が転写トレー６から一枚ずつ送りだされ、複写装置１の左側方を垂直搬送ユニット４２により上方に向けて搬送される。ここで前記のトナー画像は転写ローラ２４と感光体ドラム２０が接触する部分（転写領域）にて転写紙上に転写される。転写紙は更に搬送されて、定着部１０において熱ローラ対を通過し転写紙上のトナー画像が転写紙に溶融定着されて排出トレイ上１４に排出される。

【００１２】現像装置２２で潜像画像をトナー画像化することで消費されたトナーは、トナー濃度検知に応じて図１に示すトナー補給駆動３８が随時作動してトナーカートリッジ３４内のトナーが現像装置２２に補給される。また、転写紙に転写されずに感光体ドラム２０の表面に残留したトナーは、クリーニング装置２３により回収されてトナー回収タンク３６に排出される。このトナーカートリッジ３４とトナー回収タンク３６は複写装置１に対して着脱可能に装着されており、使用に応じて随時に新しいものと交換される。

【００１３】図１、２に示すように複写装置１の外装面にはそれぞれ独立に開閉可能に前扉３０（図１）と搬送扉３２（図２）が設けられている。前扉３０は画像形成ユニット８、トナーカートリッジ３４、トナー回収タンク３６の交換等のために、複写装置１の前面中間部で全幅に渡って設けられ、下端付近を支点に開閉される。トナーカートリッジ３４は前方より本体のリブ１２６に合わせて矢印Ｘの方向に挿入され、既定位置の当りに達すると矢印Ｙの方向に少しスライドさせてセットされる。この時、トナーカートリッジ３４の側面に突出している突起１２２が複写装置１の本体に設けられたトナー補給駆動３８と係合する。また同時に、トナーカートリッジ３４の開口部１１８の蓋が画像形成部８の突起１２４に係合して開き、現像装置２２の開口部１１６の上方に位置する。トナー回収タンク３６は、トナーカートリッジ３４を装着後、前方より複写装置１の位置決め突起１２８に低部を係合して画像形成部８のクリーニング装置２３から突出したトナー回収路１２０の下にセットされる。なお、トナー回収タンク３６とトナーカートリッジ３４とのセットされた状態における隙間は微少であり、トナー回収タンク３６を取り外さないとトナーカートリッジ３４が外せない構造になっている。

【００１４】図２に示すように複写装置１を前面から見て左側面には搬送扉３２が設けられている。搬送扉３２は複写装置１の左側面の大部分に渡って設けられ、その内面側は図３に示すように給紙部から画像形成部、定着部に渡る用紙搬送路の片面を形成している垂直搬送ユニット４０であり、ガイド部材、搬送ローラ、転写ローラ等が取り付けられている。搬送扉３２は、搬送路で転写

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紙がジャムしたときに用紙除去のために下端付近を支点に開閉される。

【００１５】ここで、前扉３０及び搬送扉３２が開状態になると装置内部の一部の回転駆動部材や電子機器が露出され手が触れる場合も想定されるため、各扉の開閉に連動して駆動モータや電子部品などへ電力を供給する通電回路をオンオフする安全手段が設けられている。その安全手段は、図１に示すように前扉３０を開いた内側の左端の側壁とトナー回収タンク３６等が設置される面とのコーナー部の空間に設けられた安全装置４２である。

【００１６】安全装置４２の外面は図１に示すように直交する３面を持つ安全装置カバー５６により覆われている。安全装置カバー５６の前面には長穴１１０が形成されており、前扉３０には長穴１１０に対応する位置に突片１１２が形成されている。そして、前扉３０が閉じられると、突片１１２が長穴１１０に挿入され内部の安全装置４２に作用してオンオフする構造になっている。また、安全装置４２は複写装置１の左側面側に隣接して設けられていおり、複写装置１の左側面には図２に示すように開口１１６が形成されいる。また、搬送扉３２にはその開口１１６に対応する位置に突片１１４が形成されている。そして、搬送扉３２が閉じられると突片１１４が開口１１４に挿入され内部の安全装置４２に作用してオンオフする構造になっている。これにより、前扉３０及び搬送扉３２のどちらか一方でも開いていれば駆動モータや電源基盤などの電子部品への通電をオフし、両方の扉が閉じられた時にのみ通電可能状態になる。

【００１７】図４において安全装置４２の構成について詳細に説明する。図４（ａ）は複写装置１の上面から見て安全装置４２の構成を示した図である。同じく図４（ｂ）は複写装置１の左側面から見た図である。また、図４（ｃ）は複写装置１の前方から見た図である。安全装置４２には移動台５０が配置されており、その上面にスイッチ５４がネジ等で取り付けられている。移動台５０は、作像フレーム２６の左壁に奥行き方向に延設成形された突起１０２と、その近傍の底壁に奥行き方向に延設成形された突起１０４が形成する溝に対して嵌合挿入され、左右・上方・回転の動きが規制され溝に沿って前後にスライド移動可能に装着されている。また、移動台５０のスライド移動方向の後部側には穴が形成され空洞になっており、その空洞にバネ５２が挿入されている。バネ５２は作像フレーム２６の前壁に当接して移動台５０を前方に付勢するものである。

【００１８】スイッチ５４には、一端が本体に係合され回動可能であり自由端側が弾性力により本体から離れる方向に付勢されて外力がない状態では一定角度を保つレバー１０６と、レバー１０６の自由端近傍に本体から弾性力により付勢され一定量突出している検知片１０８が設けられている。スイッチ５４の移動台５０への取り付けは、レバー１０６の係合部が押し込み方向側にあり移

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動方向に延設されるような向きになっている。また、スイッチ５４には、複写装置１内の電子機器に通電する回路の配線がコネクタの挿入により連結され、検知片１０８が押し込まれた状態で回路をオンし、一定以上突出すると回路がオフする構造になっている。

【００１９】移動台５０及びスイッチ５４を含んだ安全装置４２は、互いに直交する３面から構成された安全装置カバー５６が本体に係合して取り付けられて覆われている。そこで、移動台５０はバネ５２で前方に付勢され、安全装置カバー５６の内面に当接してその移動位置が規制される。また、その当接する面の部分には人の指が入り込まない程度の幅でスリット状の長穴１１０が設けられている。前扉３０には前記の長穴１１０に対向する位置に、長穴１１０の幅よりも厚みの薄い板状の突片１１２が形成されている。前扉３２を閉じるとき突片１１２は長穴１１０に侵入し移動台５０の前面部に当接しながらバネ５２の付勢に抗して後方に移動させる。前扉３０が閉じられて移動台５０が後方に押された状態の位置において作像フレーム２６の側壁部には、スイッチ５４のレバー１０６の長さ方向に渡って対向する位置に指が入らない程度の幅で開口１１６が形成されている。また、搬送扉３２には前記開口１１６に対応する位置に開口幅よりも厚さの薄い突片１１４が形成されている。突片１１４の先端部の片側には傾斜部が形成されている。搬送扉３２が閉じられるとき突片１１４は作像フレーム２６の開口１１６に侵入し、スイッチ３４のレバー１０６に当接して検知片１０８を押し込み通電状態にする。

【００２０】次に、本発明に係わる安全装置４２の動作について説明する。前扉３０と搬送扉３２が共に閉じられているときには、移動台５０は前扉３０の突片１１２に押し込まれて図４（ａ）の位置にあり、搬送扉３２の突片１１４がスイッチ５４のレバー１０６に当接し検知片１０８押し込み、複写装置１は通電状態になっている。ここで、図５に示すように、搬送扉３２が開かれると突片１１４がスイッチ５４のレバー１０６から離れスイッチ５４はオフされ、複写装置１は非通電状態となる。次に、搬送扉３２を閉じた状態で前扉３０を開く場合には、前扉３０の回動に従い突片１１２が移動するため移動台５０はバネ５２に押されてスイッチ５４とともに前方に移動する。一定以上移動すると、スイッチ５４のレバー１０６が搬送扉３２の突片１１４の対向位置から外れてしまい自由な状態に復帰するため、非通電状態になる。さらに再び前扉３２を閉じれば、突片１１２により移動台５０とスイッチが後方に移動し、レバー１０６が搬送扉３２突片１１４の先端の傾斜部に当接して滑らかに押されて、再び通電状態になる。これにより、複写装置１は操作途中で前扉３０もしくは搬送扉３２を開いて作業する場合には自動的に非通電状態となるため、作業の安全が確保される。また、安全装置はカバーで指などが触れないようにカバーで覆われているので、誤作

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動する危険性も少ない。

【００２１】以上、前面と側面に設けられた二つの扉の場合についての具体例を説明したが、扉の位置や数や開閉機構は実施例に限定されるものではない。移動台の形状やスイッチのレバーの長さや形状、移動台やスイッチのレバーに作用する扉の突片などの形状を個々の電子機器に応じて適宜変更することで、多様な構成の装置に対応することが可能である。

【００２２】

【発明の効果】以上説明したように、本発明の電子機器の安全装置は外装部に設けられる複数の扉の開閉動作に対応して通電をオンオフさせるに際して、個々の扉に個別の安全装置を設ける必要がなく、一つの安全装置が共用されるため、コスト削減が図れるとともに占有スペースが減少し装置の小型化が可能である。

【００２３】さらに、各扉は独立に開閉可能であるために取り扱いの自由度が増し、操作者の作業を容易とするとともに、誤操作の危険性を低減してそれによる機械の破損などを防止する優れた構成である。

【図面の簡単な説明】

【図１】本発明に係わる安全装置を備えた複写装置の外観図。

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【図２】本発明に係わる安全装置を備えた複写装置の外観図。

【図３】本発明に係わる安全装置を備えた複写装置の主要な構成を示す断面図。

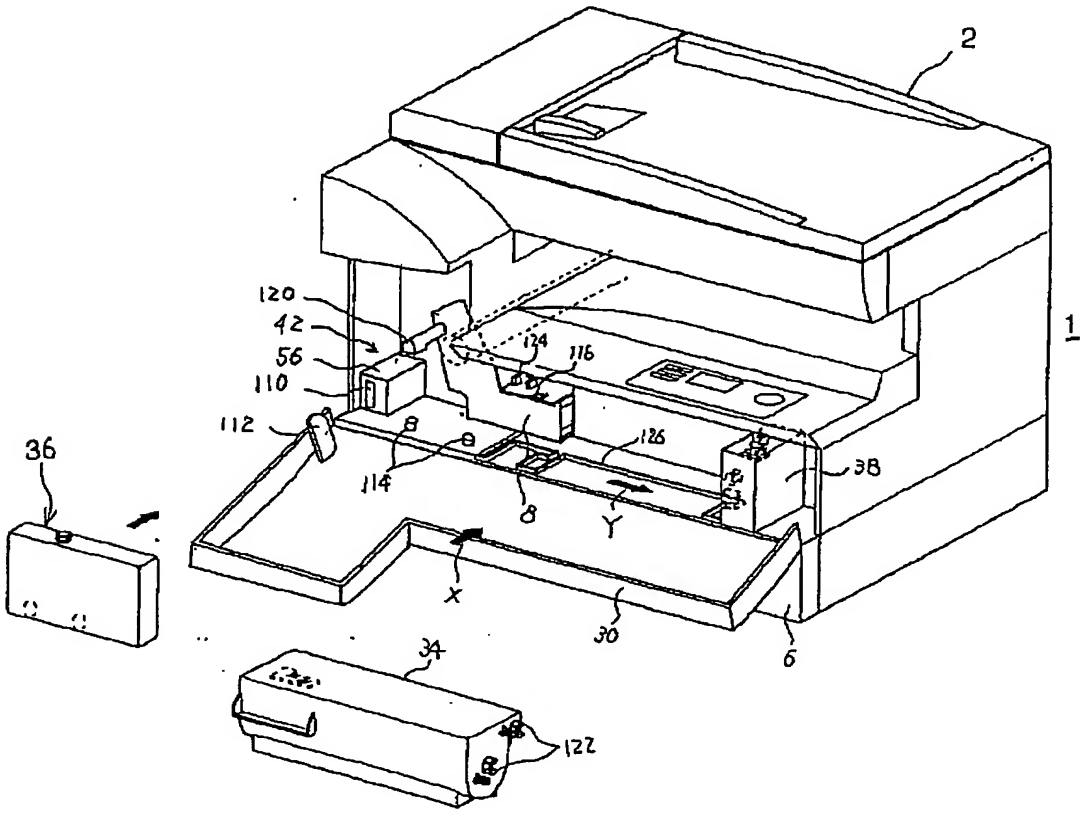
【図４】本発明の安全装置の構成と動作を説明する図面。

【図５】本発明の安全装置において前扉が開いた時の安全装置の状態を示す図面。

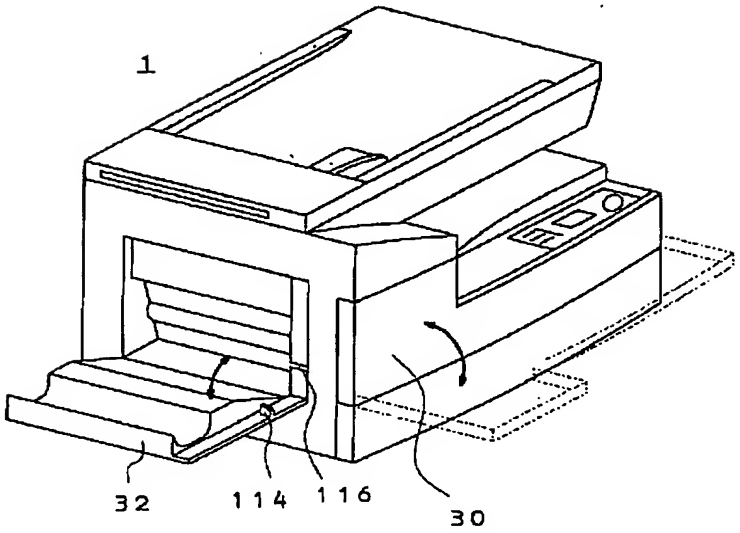
【符号の説明】

３０　前扉
３２　搬送扉
４２　安全装置
５０　移動台
５２　バネ
５４　スイッチ
５６　安全装置カバー
１０６　レバー
１０８　検知片
１１２　突片（前扉）
１１４　突片（垂直搬送扉）

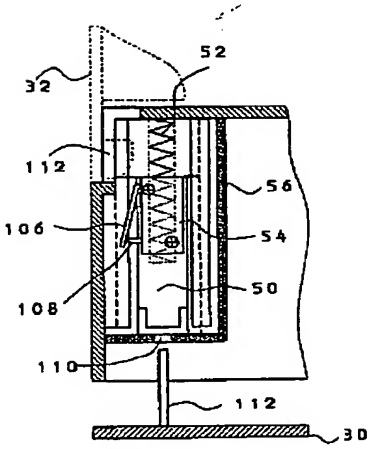
【図１】



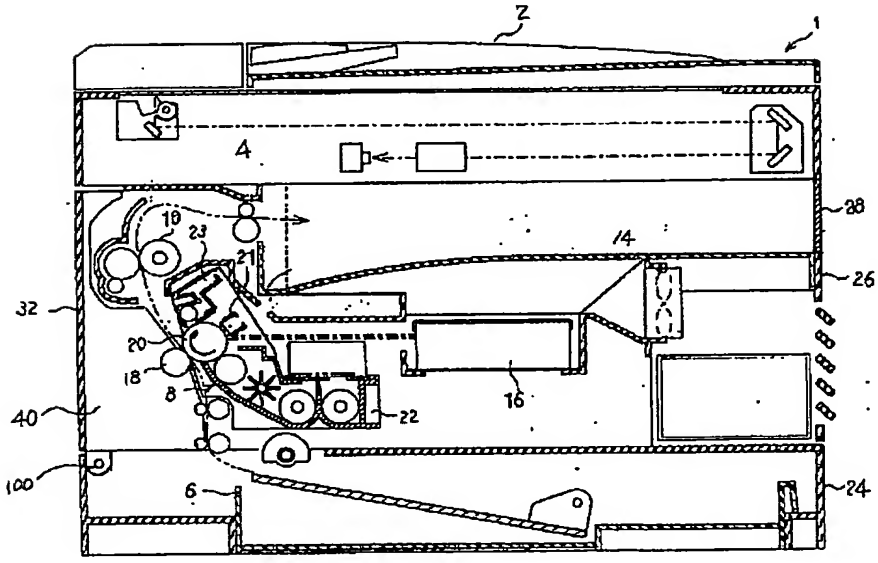
【図２】


1
32
114
116
30

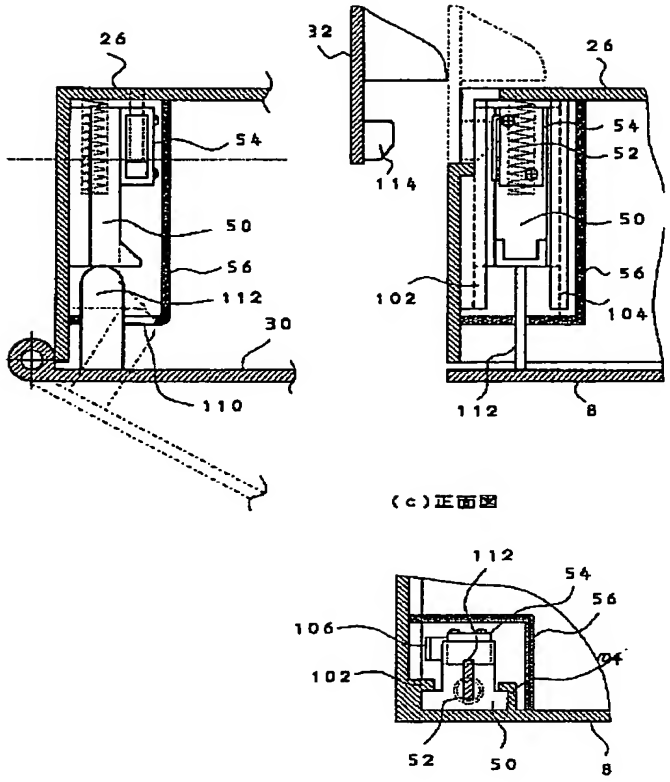
【図５】


52
32
112
56
106
54
108
50
110
112
30

【図３】


Z
1
4
28
14
26
32
10
23
21
20
18
8
22
16
40
100
6
24

【図４】

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